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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,483	09/08/2003	Brian E. Curcio	END920000122US3 (IEN-10-5)	7494
26681	7590	09/11/2006	EXAMINER OLSEN, ALLAN W	
DRIGGS, HOGG & FRY CO. L.P.A. 38500 CHARDON ROAD DEPT. IEN WILLOUGHBY HILLS, OH 44094			ART UNIT 1763	PAPER NUMBER

DATE MAILED: 09/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/657,483

Applicant(s)

CURCIO ET AL.

Examiner

Allan Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2006.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
4a) Of the above claim(s) 13, 14 and 17 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-12, 15, 16 and 18-20 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 08 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Claims 13, 14 and 17 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on September 6, 2005.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the removal of residue by polishing must be shown or the feature canceled from claims 16 and 18. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

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application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Double Patenting

Applicant is advised that should claim 2 be found allowable, claim 11 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20 includes the following recitation:

forming a second core member, wherein forming the second core member includes:

repeating the above steps to form the second core member,

wherein the "recipe" for forming a second member is to repeat the steps that are used to form the second member. However, no steps for forming the second member have been set forth, other than to repeat a set of undisclosed steps.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 7-12, 16 and 18-20 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent 6,376,052 issued to Asai et al. (hereinafter, Asai).

Asai teaches forming a hole through an insulating substrate that has both surfaces covered with conductive copper coating (see figure 2b). Asai teaches dispensing a conductive material into the through hole openings such that the conductive material extends through each conductive copper coating (3 of fig. 2c and 5 of fig 2 e). Asai teaches removing a portion of the conductive copper coating to allow a nub of the conductive material to extend above the substrate (see figure 3b). Asai teaches the conductive material 5 may comprise a filled polymer, for example a filled thermoset or a filled epoxy (column 9, liner 1-34). Asai teaches plating the sidewalls of the through

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hole with conductive material 3 before dispensing conductive material 5 into the hole (figure 2c). Asai teaches polishing the substrate so as to remove the filler that protrudes above the electrolytic plated film (column 15, lines 6-13). This polishing leaves filler material that extends beyond the substrate to the top of the electrolytic plated film. This remaining filler material constitutes the claimed nub of filler material. Asai teaches removing the conductive copper coating by etching (column 15, lines 22-40). Asai teaches the substrate is glass-reinforced epoxy (column 13, lines 19-24). Asai teaches removing excess conductive material by chemical polishing (column 38, lines 5-8).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asai.

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The above noted teaching of Asai is herein relied upon. Additionally, it is noted that Asai teaches using a squeegee to fill the through holes with resin.

Asai does not teach filling the holes with resin in multiple passes. Asai does not teach curing the epoxy to between 20% and 80%.

It would have been obvious to one skilled in the art to cure the epoxy to between 20% and 80% because Asai teaches curing to a B-stage which is a partially cured resin, often in the 20% -80 % cure range. Furthermore, as the percentage of curing directly impacts a resin's viscosity, it would be obvious to optimize the percentage of curing to provide a viscosity that would facilitate the filling of the through-hole with the conductive material. When using a squeegee to fill a through hole with a conductive paste, it would have been obvious to one skilled in the art to use as many passes as is necessary in order to completely fill the through holes.

Response to Arguments

Applicant's arguments filed June 16, 2006 have been fully considered but they are not persuasive.

Applicant argues:

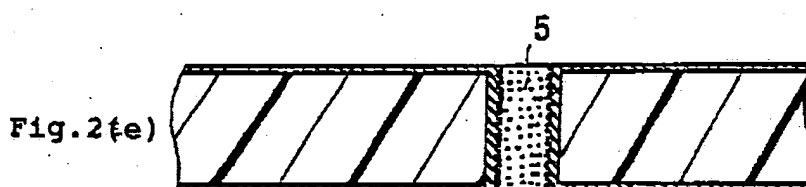
In particular, Asai et al. do not teach or suggest dispensing the conductive material in such opening, forming such nub by removing at least a portion of the conductive coating, and then electrically joining the nub with another as recited in the subject claim. Instead, Asai et al. simply disclose filling through-holes 3 with a filler 5 (Fig. 2(e) and col. 19, ll. 57-67) and then forming a film 6 over the substrate and the filled through-holes 3 (Fig. 2(f) and col. 20, ll. 1-6). Various other steps are then performed to create a printed wiring board in which the filler 5 is covered by several layers (Fig. 3(a) – Fig. 5(b)). However, Asai et al. do not teach or suggest forming a nub of filler 5 after filling the through-holes 3 by removing conductive coating from the substrate 1 and then electrically joining the nub of filler 5 with another nub. In addition, Asai et al. do not teach or suggest dispensing an electrically conductive material in such opening as recited in the subject claim. Rather, Asai et al. disclose using a screen printing, drying, and curing technique to fill the through-hole 3 with the filler 5 (Col. 20, ll. 57-61).

In response to the following statement:

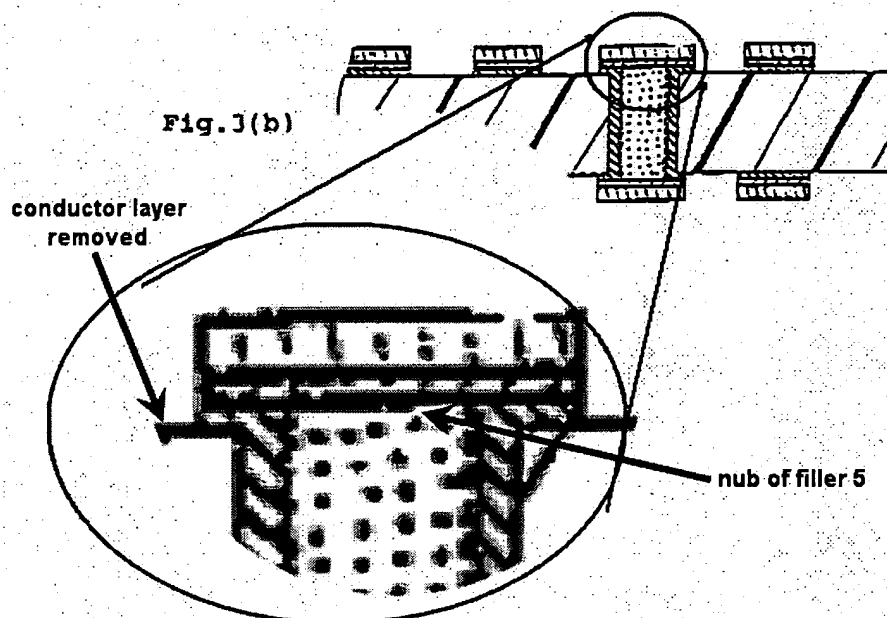
" Asai et al. do not teach or suggest forming a nub of filler 5 after filling the through-holes 3 by removing conductive coating from the substrate 1 and then electrically joining the nub of filler 5 with another nub."

the examiner notes that figure 2(e) of Asai shows the filling of through-hole 3 with filler

5.



And, the following detail of Asai's figure 3b shows filler 5 extending above the surface of the core layer (i.e., a nub of 5) after the removal of the conductive coating 3



In response to the assertion that,

"Asai

et al. do not teach or suggest dispensing an electrically conductive material in such opening as recited in the subject claim. Rather, Asai et al. disclose using a screen printing, drying, and curing technique to fill the through-hole 3 with the filler 5 (Col. 20, ll. 57-61)."

the examiner notes Asai teaches that filler 5 is a conductive material.

With respect to the 103 rejection, applicant argues that no reference or motivation is provided to support the allegation that it would be obvious to vary the extent of the cure and to perform multiple passes to fill the opening.

In response, the examiner notes that a motivation to vary the extent of the cure was provided in that it was recognized that the extent of cure effects the viscosity of the fill material and one skilled in the art would be motivated to operate within a viscosity range that would actually enable one to fill the through-hole. Regarding the multiple pass limitation - if it was not obvious to a person to use two or more passes of the squeegee after a first pass failed to fill the through-hole, the examiner maintains that such a person could ne'er be considered one skilled in the art.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441.

The examiner can normally be reached on M, W and F: 1-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Allan Olsen', with a stylized, cursive script.

Allan Olsen
Primary Examiner
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